UNITED NATIONS
ECONOMIC AND SOCIAL COUNCIL

Distr.
LIMITED

E/ECA/ENV/36
20 November 1986

Original: ENGLISH

ECONOMIC COMMISSION FOR AFRICA

Joint ECA/UNEP/ESAMI Training of Trainers' Workshop to Incorporate Environmental Components into the Training Programmes of the Eastern and Southern African Management Institute (ESAMI)

UNEP Headquarters, Nairobi, Kenya
8-19 December 1986

LC/NAIROBI.

DRAFT
(Working Document)

AN INTRODUCTORY CURRICULUM FOR INCORPORATING ENVIRONMENTAL COMPONENTS INTO THE TRAINING PROGRAMMES OF THE EASTERN AND SOUTHERN AFRICAN MANAGEMENT INSTITUTE (ESAMI)

I. INTRODUCTION

(i) Background

1. In recognition of the importance of manpower development for the management and protection of the African environment, the United Nations Environment Programme's (UNEP) Governing Council has passed several decisions relating to environmental education and training in the African region. UNEP/GC.9/12 decision of May 1981 identified environmental education and training, and technical assistance as a priority for development 1/. UNEP/GC.9/20/A of 26 May 1981, GC.9/20/D of May 26, 1981 and GC.9/21 also of May 26, 1981, all these decisions made particular references to the importance of environmental education and training in Africa. Decision GC.9/20/D requested the Executive Director of UNEP to explore jointly with UNECA the possibilities of establishing regional institutions for environmental training and education within the African region and to seek ways and means of providing support for national institutions for environmental protection and management in Africa. Again, in May 1982, UNEP Governing Council 2/ at its tenth session requested the Executive Director to enhance the role of the Environment Programme in promoting, co-ordinating and catalyzing activities in the field of environmental education and training in the African region, including public awareness. The decision also requested UNEP Executive Director in co-operation with relevant international organizations, to continue rendering support to environmental education and training programmes in the African region with a view to:

(a) Advising on the incorporation of environmental components into curricula of all institutions of learning at all levels of education and into adult education;

(b) identify, promote and strengthen national, regional and subregional institutions and programmes offering environmental education and training in the African region.

2. Pursuant to UNEP decision GC.9/20/D and directives regarding environmental education and training in Africa, a UNEP/ECA joint mission was conducted from April 19 to 30, 1982. The terms of reference of the joint mission were to consider:

(a) the status of environmental training and education in African universities;

(b) the status of national institutions responsible for environmental protection and management;

(c) to explore the possibilities of strengthening environmental training and education and national institutions; and

(d) to explore possibilities of establishing a Regional Institution for Environmental Training and Education.

1/ UNEP Governing Council ninth session, draft report, UNEP.GC.9/15, June 1981.

2/ UNEP/GC.10/14, Report of the Governing Council at its ninth session, 15 June 1982.

3. The mission was limited to the period 19 to 30 April 1982 to consult with the following governments and organizations:

(a) Nigerian Federal Ministry of Housing and Environment in Lagos;

(b) The Association of African Universities (AAU) in Accra, Ghana;

(c) The Senegal Minister de l'urbanisme, de l'habitat et de l'environnement as well as;

(d) The Environment and Development Action Institute (ENDA) in Dakar;

(e) The Kenya Ministry of Environment and Natural Resources in Nairobi including

(f) The National Environmental Secretariat and the Permanent Mission of Kenya to UNEP.

Contacts were also established with the African Network of Scientific and Technical Institute (ANSTI) in Nairobi and the African Curriculum Organization based in Ibadan.

4. Regarding the state of the art of environmental education and training at existing African Universities, the mission observed that there are a cross section of environmentally-sound degree programmes at most of the existing universities in Africa. For example, the University of Assiut, Assiut, Egypt has a degree programme comprising of public health, geology, botany and industrial pharmacy which are all environmentally-related. As a whole, most African Universities do cover a study of environmental concerns in the various traditional academic departments such as: engineering, medicine, agriculture, geology, botany, zoology, geography. The mission also observed that what is lacking in the African region is an interdisciplinary environmental education and training programmes which would incorporate the various related academic disciplines.

5. Also, at the tenth session of UNEP Governing Council held in Nairobi 20-31 May 1982, decision 10/25 (A) on environmental education and training in Africa was passed 3/. The decision advised on the incorporation of environmental component into the curricula of all institutions of learning at all level of education and into adult education and to identify and promote national, regional and subregional institutions and programme offering environmental education and training in the African region 4/.

6. This also requested the Executive Director of UNEP to convene a meeting of experts from governments and the scientific community within the region to develop a programme of action for environmental education and training in the Africa region. The meeting of Experts from Government and the Scientific Community to Develop a Programme of Action for Environmental Education and Training in the African Region was held in Nairobi, Kenya, 12-15 April 1983.

3/ UNEP Governing Council Tenth Session Report of the Governing Council, UNEP/GC.10/14, 15 June 1982.

4/ Ibid.

7. At this meeting, the Environment Co-ordination Office at UNECA presented document E/ECA/ENV/8 entitled "Incorporation of Environmental Components into Training Programmes of ECA-sponsored Institutions". This document stressed that one of the most appropriate methods to promote environmental education and training aid and hence, create environmental awareness, was to utilize existing ECA-sponsored institutions as a delivery system.

8. As a follow-up to these activities regarding environmental education and training in Africa, the United Nations Economic Commission for Africa (UNECA) Environment Section developed a project proposal "Introduction environmental components into the training programme of ECA-sponsored institutions". The objective of the project was to implement ECA's Plan of Action for environmental education and training in Africa. This project proposal was sent to UNEP for funding to be implemented jointly by ECA and UNEP. The project was funded by UNEP on 30 October 1984.

9. At their Third Conference of Chief Executives of ECA-sponsored Regional and Subregional Institutions, Addis Ababa, 29 November-December 1982, the following eleven ECA-sponsored institutions expressed their willingness to incorporate environmental dimensions into their existing training programmes. Therefore, they are the participating agencies that will be incorporating environmental components into their training activities:

1. African Institute for Higher Technical Training and Research (AIHTTR), Nairobi, Kenya;

2. Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS), Nairobi, Kenya;

3. African Regional Organization for Standardization (ARSO), Nairobi, Kenya;

4. African Regional Centre for Engineering Design and Manufacturing (ARCEDEM), Ibadan, Nigeria;

5. Regional Centre for Training in Aerial Surveys (RECTAS), Ile-Ife, Nigeria;

6. Institut pour la formation et de recherche démographique (IFORD), Yaounde, Cameroon;

7. African Development Bank (ADB), Abidjan, Ivory Coast;

8. Institute for Economic Development and Planning (IDEP), Dakar, Senegal;

9. African Regional Centre for Technology (ARCT), Dakar, Senegal;

10. African Remote Sensing Centre (ARSC), Ouagadougou, Burkina Faso;

11. African Centre for Applied Research and Training in Social Development (ACARTSOD), Tripoli, Libya;

12. In December 1985, the Eastern and Southern African Management Institute (ESAMI), located in Arusha, Tanzania expressed interest as additional participating institution.

10. For the purpose of implementation, the joint UNEP/ECA project is divided into two main phases: Phase I consists of a mission to collect data on the training courses of interested ECA-sponsored institutions, the development of a comprehensive introductory curriculum, and this training workshop for incorporating environmental components into the training programmes of the twelve mentioned ECA-sponsored institutions. Whereas, Phase II includes the publication of the curriculum and the actual incorporation of environmental dimensions into the training programmes of the participating institutions.

(ii) General objectives of the Curriculum

11. The Curriculum has long-term objectives and immediate objectives.

Long term objectives:

- To develop a citizenry that has a basic understanding of humanity's relation and interaction with the total environment, a citizenry that understands the need for maintaining ecological balance, a public which is aware, concerned and motivated to work on solutions to environmental problems;

- To provide the motivation and training that enable citizen to acquire and spread the knowledge and skills that will help society to solve interrelated environmental problems and prevent their recurrence;

- To make the public aware that every citizen is environmental decision-maker on one scale or another;

- To provide accurate up-to-date information, concepts, principles and values about environmental management in Africa, so that each country and the region can make the best possible decisions regarding the environment and its protection; and

- To promote the goals, objectives and principles of environmental education and training adopted at the Tbilisi Intergovernmental Conference.

Immediate objectives:

- To expose to the teaching staff of ESAMI, the need to introduce environmental dimension into their present training activities;

- To provide an interdisciplinary environmental core curriculum to be adapted to the specific sector of each Division of ESAMI;

- To produce an enlightened class of policy and decision makers in the African region and other officials involved in developmental activities which might have environmental impact with the necessary environmental skills to make appropriate coast-effective environmental protection decisions;

- To generate the skills and techniques necessary for the development of curricula in environmental education and training;

- To discuss, through the workshop and discussion groups the development of strategies and guidelines of incorporating environmental dimension into training programmes of ESAMI;

- To provide ESAMI with an introductory curriculum for incorporating environmental dimension into their training programmes.

12. This document was first developed as a working draft paper (ECA/SDEHSD/CDTW/ENV/3) "An Introductory Curriculum for Incorporating Environmental Components into the Training Programmes of ECA-sponsored Institutions", and was presented to the Joint ECA/UNEP/ADB Curriculum Development Training Workshop on the Incorporation of Environmental Components into the Training Programmes of ECA-sponsored Institutions, held from 18 to 23 November 1985 in Abidjan, Côte d'Ivoire. It is being revised for the joint ECA/UNEP/ESAMI training of trainers' workshop to incorporate environmental components into the training programme of ESAMI. The Eastern and Southern African Management Institute (ESAMI) didn't attend the First Joint ECA/UNEP/ADB Workshop (18-23 December 1985) to incorporate environmental components into the training programmes of ECA-sponsored institutions; therefore, this workshop is to be held for the Institute to incorporate environmental components into its training activities.

II. ENVIRONMENTAL MANAGEMENT CONCEPTS AND CURRICULUM PRINCIPLES

The Meaning of Environmental Management

13. Human intervention is often blamed for the deteriorating environment. The environment is sometimes defined as the stock of physical, biological and social resources which are available for the satisfaction of basic human needs for food, shelter, clothing, education and productive work. Development may be understood in terms of the processes for meeting these basic needs. Environmental problems have therefore been linked both with the state of underdevelopment as well as with the development process itself.

14. Development means total social development in which the key factors are not primarily economic, but are human and social, and are in fact concerned with those basic human needs which should be met by the development process. It is now clearly understood that mismanagement of the development processes results in environmental degradation. Understanding of the nature of environment/development issues produces a clearer idea of how to reconcile environmental and development objectives. One of the most important ways in which this can be done is through environmental management.

15. Environmental management basically refers to management measures to protect and preserve the environment. There are two sets of circumstances when such management measures are needed in order to sustain the health and vitality of the natural environment. In the first place, there are natural factors and processes which may, in the normal course of natural evolution, adversely affect the environment; monitoring, assessment and corrective measures are required to assert, if possible the causes and effects of such natural processes in order to restore the life and health of the natural environment.

16. Environmental management is the means by which environmental considerations are introduced into the entire decision-making process, so that all those who take decisions, whether as individuals or on their behalf, act in an environmentally responsible manner. Environmental management therefore is not just about the management of the environment, but about managing all the decisions which bear upon the environment, so that environmentally destructive forces are restrained and environmentally positive ones encouraged.

17. Environmental management has its place at various levels of decision-making, from the laying down of broad objectives for society to the detailed implementation of development plans. It is a process of relevance at every geographical scale, from the global to the local. It is of concern to all countries, whether they be centrally-planned or market economies, or whether they be developed or developing.

18. It is relevant to the actions which people take as individuals or collectively. In brief, environmental management involves the conscious addition of the environmental dimension to all aspects of human endeavours.

Curriculum and Training Effectiveness

19. A curriculum basically deals with the content and methodologies (including instructional aids) which should guide instruction for the acquisition of knowledge, understanding and applications in a particular field, the skills needed for applying knowledge gained to areas of practical application, and favourable attitudes, motivations related to the subject matter of concern. It should reflect the cultural, social, political and economic hopes and aspirations of the country and its people, and provide for addressing the societal problems, issues and needs which make up their national concerns.

20. The content for environmental training should adequately reflect the prevailing concerns for the environment. The following actions are needed in order to reach the level of effectiveness that an environmental training programme should produce:

(i) Identification of environmental factors, problems and concerns which must be reflected in the education/training programme;

(ii) Curriculum development/revision to include these environmental elements in instructional programme(s);

(iii) Educational technology to construct teaching materials and audio-visual aids for effective implementation of the curriculum;

(iv) Development of appropriate environmental management programmes for the in-service and pre-service education and training of professional groups;

(v) Commissioning of research studies into curriculum materials related to the environment, modes of delivery and the end products of environmental knowledge and awareness.

21. The methodology for environmental training is dictated by the nature of the environment itself and its associated problems. The environment is characterized by multi-dimensionality. It has both bio-physical and socio-cultural dimensions,

and no single field of knowledge by itself can adequately explain the nature, characteristics or behaviour of the environment. Indeed the solution of environmental problems requires the individual contributions of several disciplines to make it multi-disciplinary, or the interactive contributions to make it inter-disciplinary.

22. The training models to be used for environmental training must therefore be similarly inter-disciplinary. By this is meant that not only the content must be drawn from the relevant contributions of several disciplines, but also the appropriate methodologies result from the associated modes that each discipline brings to the solution of a particular problem.

Basic Assumptions

23. Some of the characteristics of environmental education and training which have emerged from previous analysis include:

(i) the adoption of a holistic perspective which examines the ecological, social, cultural and other aspects of a problem;

(ii) the use of a problem-solving strategy which is based on inter-disciplinary methods;

(iii) a practice-oriented approach which focusses on the practical aspects of an environmental problem; and

(iv) the application of systems analysis to environmetnal problems, and to instructional systems of which environmental education and training is a part.

24. The above characteristics are reflected in the core curriculum as basic assumptions underlying the training model through which the curriculum will be operationalized. The core curriculum therefore assumes an inter-disciplinary approach which is deemed appropriate, for this environmental training model consists of four major phases:

1. Analysis (of the problems that will form the basis of training);

2. Design (of the training system, i.e. the organizational principle by which a training operation may be developed);

3. Development (of the training system);

4. Evaluation.

25. As adapted for the solution of training problems, this model of systems approach consists of five major phases:

(a) Definition of input, output and subject matter;

(b) Identification of the operational conditions and constraints (e.g. training facilities, aids, etc.);

(c) Design and production of the training components (content, methods, etc.);

(d) Evaluation and refinement of the system (through effective feedback);

(e) Operational monitoring of the output for quality control.

A major input of the training system is the untrained person. The output of the system is the trained person. The output is further defined by stating clearly the following:

(i) what the trainee must be able to do upon completion of the training;

(ii) the level of proficiency desired;

(iii) the conditions under which the trained behaviour must be demonstrated.

III. CORE CURRICULUM FOR INCORPORATING ENVIRONMENTAL TRAINING COMPONENTS INTO THE TRAINING PROGRAMMES OF ESAMI

Target Groups

26. The core curriculum has been developed for the purposes of environmental training of participants (students and trainers) who are involved in the programmes of ECA-sponsored institutions. Each institution has its own training objectives, and the curricula based upon these objectives. However, the core curriculum presented here consists of the environmental elements which relate to the existing institutional training programmes. Its purpose is not to make the people who belong to these target groups into environmentalists' but to generate in them environmental awareness and a basic understanding of management concepts corresponding to the skills related to their professional work.

Environmental Foundations

27. The core curriculum is based on the multidisciplinary array of training subjects which the ECA-sponsored institutions use in their training programmes. It is a nucleus around which additional environmental themes may be built by the participating isntitutions. The environment-related themes (problems, issues, etc.) have been catalogued to produce a multi-disciplinary core curriculum which will provide a basis for the environmental sensitization of those who take the programmes offered by the institutions.

28. The following factors are to be taken into account in operationalizing the core curriculum in view of the fact that these are known obstacles to the development and implementation of environmental education and training programmes:

(a) weak conceptualization of environmental problems;

(b) blurred perception of environmental issues;

(c) lack of understanding of what environmental education/training involve;

(d) lack of strong motivation;

(e) difficulty in translating environmental problems and issues into teaching materials;

(f) high cost of introducing new materials into the curriculum;

(g) lack of trained personnel and suitable facilities.

Curriculum objectives

29. The core curriculum is expected to achieve the following objectives:

(i) To provide a curriculum basis, by example, for officials and teaching staff of ECA-sponsored institutions to introduce environmental dimension into their present training activities;

(ii) To introduce the concept of environmental management into the curricula of ECA-sponsored institutions as a strategy for resolving environment-development issues;

(iii) To explain, by means of a multidisciplinary environmental core curriculum, the role of interdisciplinary approaches of the solution of environmental problems;

(iv) To suggest a framework for producing environmentally enlightened policy and decision makers and other officials whose work or activities have a decisive environmental impact;

(v) To promote the goals, objectives and principles of environmental education and training adopted at the Tbilisi Intergovernmental Conference.

Instructional Units

30. The core curriculum is composed of five major instructional units so far:

Unit I - Environmental Management for Development;
Unit II - Environmental Assessment and Standardization;
Unit III - Drought and Desertification: social, economic and environmental implications
Unit IV - Environmental Health and Sanitation
Unit V - Environmental Aspects of Population Trends and Resources Use.

31. It is noted that for the teaching of these instructional units, the following factors have to be taken into account:

(i) The duration of each course unit would depend on the institutional arrangements. Each unit may be taught as a complete package, although examples are expected to be drawn from the substantive subject area(s) from which the environmental problems/issues were originally identified. Alternatively, the content of each unit may be incorporated into the appropriate sections of the institution's programme(s) and taught at the relevant point in the instructional sequence;

(ii) Learning objectives will be defined by each institution within the framework of its programme, and in the context of the substantive subject matter;

(iii) Appropriate methodologies as they apply to the various units on environmental training are discussed further in section under this title;

(iv) Perspectives on evaluation for the various units are given in the section under the title "perspectives on interdisciplinarity".

Unit I: Environmental Management for Development

(a) Instructional objectives:

(i) to introduce, with practical examples, the concepts of environment and development; and to show the relationship between them;

(ii) to identify environmental problems related to:

- underdevelopment and poverty; and
- the process of development;

(iii) to define environmental management operationally, and show that it is a necessary tool and condition for sustainable development.

(b) Unit content themes:

- Introduction to the environment;
- Environmental problems and their causes;
- Contemporary definition(s) of development;
- The concept of environmental management;
- The basic needs approach;
- The economics of environmental management;
- Conservation strategies for natural resources and wildlife, soils, water and energy;
- Environmental aspects of human settlements;
- Public policy issues and environmental analysis;
- Environmental considerations for industrialization, transportation and tourism;
- Environmental impact assessment;
- Infrastructure for environmental management and monitoring in Africa;
- Environmental laws, legislations and enforcement policies;
- Environmental information, data collection and processing;
- Governmental structures for environmental management;
- Planning for environmental protection.

Unit II: Environmental Assessment and Standardization

(a) Instructional objectives:

(i) To introduce environmental assessment as an essential part of environmental management; and to provide knowledge and skills on the methods and procedures of environmental assessment;

(ii) To examine standardization procedures for environmental assessment, and provide information based on scientific data, regarding environmentally safe minimum standards;

(iii) To introduce periodic monitoring concepts as a check for environmental degradation of natural resources (forests, wildlife, soil and coastal areas, water, air, vegetation cover, etc.) for corrective and preventive measures to protect the environment.

(b) Unit content themes:

- Environmental assessment as a management tool;
- Safe minimum standards for environmental protection;
- Environmental safeguards;
- Analysis of tradeoffs;
- Economic analysis of environmental projection;
- Water quality evaluation and control;
- Air quality control and monitoring of gaseous emissions;
- Measures to prevent ecological degradation;
- Developing environmental standards;
- Land use planning and soil resources use;
- Monitoring toxic chemicals in the soil, foods and feed;
- Effluent discharges and control;
- Subsidies and who pays for environmental damage in developing countries;
- Regulations, standards and licenses;
- Monitoring difficulties in developing countries;
- Criteria for ambient standards and applications;
- Sources and impact of industrial pollutants on the air, water, land and and seas.

Unit III: Drought and Desertification: Social, economic and environmental implications

(a) Instructional objectives:

(i) To inculcate in the minds of trainees, an awareness and understanding of the processes of drought and desertification, their causes and effects;

(ii) To generate the skills required for the development of national management plans for arid and semi-arid land ecosystems for sustained productivity;

(iii) To equip trainees with the knowledge, skills and commitment to promote efforts at the national and local levels, aimed at strengthening national capabilities to combat drought and desertification.

(b) Unit content themes:

- Drought and desertification: nature, causes and effects, differences;
- Social, political and economic effects of drought and desertification;
- Overgrazing and ecological carrying capacity of the land;
- Water resource management;
- Drought control;
- Desertification control;
- Impact and trends of desertification at the African regional level;
- Activities of existing UN and NGOs dealing with drought and desertification issues;

- Deforestation, soil erosion;
- The problem of firewood and use of energy resources;
- The principles of mapping and remote sensing to predict ecological changes, and for monitoring resource use;
- Sand dune movement and stabilization.

Unit IV: Environmental Health and Sanitation

(a) Instructional objectives:

(i) To identify the factors which contribute to declining environmental health and the environmental agents which are responsible, directly or indirectly for poor health, resulting in sickness, disease or death;

(ii) To sensitize trainees to the existence of health risks resulting from occupational hazards, and generate awareness in them for measures which must be taken in order to ensure occupational safety;

(iii) To provide knowledge and understanding of effective legal, regulatory and technical measures for the management of pollutants and contaminants, including improvements in food control systems and the management of hazardous wastes;

(iv) To establish a basis for the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention of workers diseases caused by their working conditions; the protection of workers in their employment from risk resulting from factors adverse to health.

(b) Unit content themes:

- Environmental factors and human health;
- Health concerns in factors for occupational safety;
- Safety of agricultural chemicals - excess fertilizers, pesticides, insecticides, etc.;
- Occupational health and waste disposal in specific industries: cement, pulp and paper, asbestos, dairy, coffee, cotton, iron and steel, leather tanning, etc.;
- Large dams and irrigation schemes and water-borne communciable diseases;
- Principles of pollution control;
- Guidelines on risk management and accident prevention in the chemical industry;
- Environmental guidelines for engine emission and motor vehicle pollution;
- The principles of epidemiology in community health;
- Environmental guidelines for siting of industrial projects;
- Food standards and contamination by biological, chemical, radiation agents;
- Noise pollution: physiological and pathological effects;
- Disposal of solid wastes - municipal, industrial, mining;
- Occupational exposure;
- Sanitation technology for community water supply, sewerage and waste water disposal and vector control.

Unit V: Environmental Aspects of Population Trends and Resources Use

(a) Instructional objectives:

(i) To introduce demographic trends in population studies which can have adverse environmental impacts;

(ii) To examine the economic, social, cultural and environmental inter-relationship between population growth and resources use;

(iii) To develop environmental awareness of the problems of population control measures for conservation of natural resources and for the improvement of the quality of life.

(b) Unit content themes:

- Demographic trends in Africa with environmental impacts such as fertility, mortality, age distribution and size of national population in African countries;
- Population increase and annual growth rate of 2.9-3.0 per cent in relation to agriculture and food production growth rate of 1.4 per cent (1980-1990);
- National population distribution in relation to land use pattern and ecological carrying capacity for human beings and animals;
- Population migration trends from rural to urban areas and impacts such as slums and squatter settlements, insanitation, less agricultural labour, urbanization and unemployment;
- Phenomenal growth of cities and towns, urban stress and inadequate services leading to frequent breakdown of telecommunciations, power cuts, traffic jams, air pollution and garbage disposal problems;
- Impact of political and environmental refugees on resources use and services;
- Government efforts to influence fertility;
- Environment, population and technology in developing countries;
- Demographic change and food production.

Appropriate Methodologies and Training Aids

32. The appropriate training techniques are selected from a variety of choices after:

1. A training need has been properly validated (e.g. the need for training in environmental management arises from identified environmental problems);

2. A worthy set of training goals/objectives has been established;

3. Relevant content selected; and

4. Precise behavioural objectives identified.

33. For the purposes of environmental management training, the methodologies chosen would naturally focus on practical, analytical and problem-solving interdisciplinary approaches. The following standard techniques are among the most relevant:

A. Case method/incident process

Case study is a written or filmed description of an actual or imaginary situation presented in some detail; individuals, small team, or group analysis of the case is used to uncover the critical facts of the case (there are many case histories or study of particular environmental problems or phenomena in a particular place).

B. Conference/Clinic

In the learning environment, a conference is a meeting (in the training context) of trainees, trainers and/or consultants to analyze a topic or a problem, plan a course of action, for solving the problem.

C. Demonstration

An illustrated lecture or practical/experiment or explanation done by a person or group, or filmed to show how something works or gets done.

D. Discussion (groups/plenary)

A conversation between trainees, trainers and/or consultants, aimed towards a learning objective.

E. Field trip

The trainees travel to a realistic environment which provides the sights, sounds, equipment or operations that are connected with the purpose of training.

F. Lecture

An organized verbal presentation (which may be accompanied by visual aids) by a speaker to a group of trainees - listeners who are expected to retain key concepts and specific bits of knowledge contained in the lecture. It may also be followed by a discussion on the contents of the lecture.

G. Laboratory

A practical setting in which facilities (equipment, etc.) exists for trainees to carry out experiments and other practical activities, individually or in groups.

H. Modelling

Involves a description of an ideal or typical system to be used as the basis of an analytical discussion by trainees.

I. Programmed instruction

The material to be presented appears in small carefully sequenced segments (called "frames"). Each frame elicits a response from the learner, who immediately finds out whether or not his response was correct.

J. Related reading/handouts

Assignments to be accomplished either inside or out of formal class hours.

K. Simulations/games

Training exercise using a model of business situation. The model may deal with an entire operation, or with a single aspect or function. Given basic data about the situation, participants make key decisions and follow their decisions through to the next consequences, when they again decide what to do. The cycle continues until the simulation has affected the learning objectives for which it was designed.

L. Symposium/panels/forum

A meeting at which several speakers deliver short addresses on a topic. It is thus like a panel, but in a strict definition, has no provision for further feedback from the trainees. In some cases, questions are asked by the audience and responses given by one or more members of the panel.

M. Syndicate/working groups

Small groups of trainees are assigned specific tasks as part of a larger instructional design.

N. Workshop/Seminar

A learning environment in which participants are involved in practical activities, emphasizing free discussion and practical methods, skill and application of principles.

34. The methodology or training technique used for any instructional unit or theme would depend upon the extent to which equipment/instruments and various audio-visual aids are available. Educational technology refers to the organized design and implementation of learning systems, taking advantage of modern communication methods, visual aids, classroom organization and teaching methods. In this perspective educational technology is also conceived as a system approach to the teaching-learning process, centering around the optimal design, implementation and evaluation of teaching and learning. It is therefore an inseparable part of curriculum research and development, and cannot be seen in isolation from it.

35. Audio visual aids which are likely to facilitate the environmental teaching/training process should include:

1. Displays and exhibits (materials or media)

An accumulation of visual aids (pictures, models, graphs, charts) and objects (models, books, tools, machines) which permit trainees to see things related to the topic or process they are studying.

B. Films (a form of training material)

Films in all forms (sound motion pictures, silent films, projected pictures, strip films, videotapes, etc.) are media, not techniques. They can be used during any of the other techniques.

C. Handouts (a form of training materials)

Printed documents applied to each trainee and containing summary of the ideas in the lectures, demonstrations or discussions.

D. Models (a form of training materials)

Models are training aids rather than a technique; they are usually three-dimensional.

36. Application of the systems approach, especially the principles of educational technology as advocated here for facilitating the effective environmental training at ECA-sponsored institutions, implies that the combination of approaches, methods, materials and media should be chosen, so as to maximize the probability that the trainees will learn, i.e. achieve the prescribed objectives.

A Note on Evaluation of Training

37. Evaluation is important as functional feedback in the planning and management aspects of the training function, and as an aid to setting and revising objectives, design and content of courses.

38. Evaluation should be regular, systematic and rigorous. If the course objectives are clearly specified, evaluation can then be undertaken more effectively. The agents in the evaluation process should include the trainer, the client body, sponsoring agency,the trainer's peer group (i.e. the rest of the training faculty), external assessors or examiners and the trainee himself, through procedures including self-evaluation. Furthermore, such evaluation should apply to all aspects and inputs of relevance including the infrastructure facilities, the role and competence of trainers, and the performance of trainees.

39. The key element should be to aim at the professionalization of the training process. There should be both internal evaluation of the training institution's programme in terms of its objectives and procedures and external evaluation in collaboration with sponsoring agencies. Evaluation may take various forms, including such instruments as questionnaires, interviews, projects (including research), verbal presentations (e.g. seminars), technical papers, examinations, etc., the use of any particular instrument depending on the nature and type of evaluation desired.

40. Evaluation may be taken in the following stages:

1. Setting and defining, with sufficient clarity, the precise objectives to be achieved by the programme;

2. Then, during the training (evaluation by the trainees and the trainer);

3. Immediately after the conclusion of the training (evaluation by the trainee, the trainer, the trainer's peer group and other external agents);

4. A longer-term post-programme evaluation at specified intervals (evaluation by the trainer, the trainee and his sponsoring department or agency possibly through longitudinal studies).

Perspectives on Interdisciplinarity

41. In order to understand the term "interdisciplinary" which has been used in the context of the core curriculum and the relevant methodologies, we need to define first the term "discipline" and see how the related terms "multidisciplinary" and "interdisciplinary" evolve from it.

42. A discipline is a given homogeneous subject matter, that is a specific body of teachable knowledge with its own background of education, training, procedures, methods and content areas. In order to characterize the nature of a given discipline and to distinguish it from other disciplines, it is useful to apply the following criteria based on epistemological grounds:

(i) the "materials field" (Piajet);
(ii) the "subject matter";
(iii) the "level of theoretical integration";
(iv) the "methods";
(v) the "analytical tools";
(vi) the "applications in the fields of practice";
(vii) the "historical contingencies".

43. Multidisciplinarity means the juxtaposition of various disciplines, sometimes with no apparent connection between them (e.g. music + maths + history).

44. Interdisciplinarity implies the interaction among two or more different disciplines. This interaction may range from simple communication of ideas to the mutual integration of organizing concepts, methodology, procedures, epistemology, terminology, data and organiztion of research and education in a fairly large field. For example, environmental education is an interdisciplinary array which brings together a wide range of subject fields from both the natural and social sciences; and the solution of a particular environmental problem may require knowledge, methods and procedures from these various fields.

Guidelines for the Use of the Core Curriculum

45. The training course based on the proposed core curriculum should be as practical as possible, making use of examples and illustrations, and case studies. Although the courses should be more practical and less theoretical, theory must be used to explain practice, to define concepts and to provide a theoretical/operational framework within which the matter or phenomena under consideration will be conceptualized and understood.

46. The training should be problem-focussed in the sense that the primary thrust of environmental education/training is to solve environmental problems and prepare the way for effective environmental management. Trainees should be organized to come face to face with the problems under investigation, and therefore their training must also be as far as possible experience-based.

47. Interdisciplinarity requires that all the disciplines that can contribute to the solution of an environmental problem, or to the development of an effective environmental management strategy should be mobilized. Trainers should be encouraged to use the expertise of others where the use of such disciplines will contribute interdisciplinarily to the understanding of, and solution to an environmental problem or issue. A framework should be established for experts from different disciplines to work together to demonstrate the interaction of ideas, of methods and of processes.

48. The trainees' interests, attitudes and motivation should be mobilized in order to ensure full and effective participation in the training process. The design and organization of the training programme should be such as to inspire and motivate the trainees. Their ideas and suggestions should form part of a dynamic process of making the core curriculum operational, making changes where necessary, hence always ensuring that the objectives of training are attained.

49. Continuous monitoring and assessment should be central in the evaluation process. Feedback from such a process will provide a basis for both improving the programme and its effectiveness, and ensuring quality output from it. Every available resources must be mobilized especially those which educational technology can offer, in order to strive towards achieving the goals of environmental education and training.